POZNER, Viktor Mikhaylovich; KIRINA, Tamara Il'inichna; PORFIR'YEV, Oleb Sergeyevich. Uchastvovali: APRODOVA, A.A.; VISSARIONOVA, A.Ya; ZAKHAROVA, M.M.; KILIGINA, M.L; KOVYAZINA, N.M.; LUN'YAK, I.A.; MUSINA, K.K.; ORLOVA, I.N.; SAVINOVA, S.I.; TAZLOVA, Ye.N.; TERENT'YEVA, V.D.; FADEYEVA, M.I.; CHERNOVA, Ye.I.; SHEL'NOVA, A.K. TIKHIY, V.N.,red.; DAYEV, G.A.,ved.red.; GENNAD'YEVA, I.M.,tekhn.red.

[Volga-Ural oil-bearing region; Carboniferous sediments] Volgo-Ural'skaia neftenosnaia oblast'. Kamennougol'nye otlozheniia. Leningrad, Gos.nauchn.tekhn.izd-vo neft. i gorno-toplivnoi lit-ry, 1957. 287p. (Leningrad. Vsesoiuznyi neftianoi nauchno-issledovatel'skii geologorazvedochnyi institut. Trudy no.112) (MIRA 11:12)
(Volga Valley--Geology, Stratigraphic)
(Ural Mountain region--Geology, Stratigraphic)

POZNER, V.M.

Stratigraphy of Lower Carboniferous terrigenous formations in the Kama-Kinel depression. Dokl AN SSSR 104 no.6:892-894 O '55. (MLRA 9:3)

1. Vsesoyuznyy nauchno-issledovatel'skiy neftyanoy geologo-razvedochnyy institut. Predstavleno akademikom D.V. Nalivkinym.
(Kama Valley--Geology, Stratigraphic)

ABUSHIK, A.F.; NETSKAYA, A.I.; POZNER, V.M.; SHNEYDER, G.F.; TIL'KINA, K.F.; SAMOYLOVA, R.B.; SMIRNOV, N.F.; POLENOVA, Ye.N.; MANDEL'SHTAM, M.I.; LYUBIMOVA, P.S.

New genera and species of Ostracoda. Trudy VNIGRI no.115:232-299 '58. (MIRA 11:10)

(Ostracoda, Fossil)

Pozner, V. M.

3(5) PHASE I BOOK EXPLOITATION SOV/1897

Vsesoyuznyy neftyanoy nauchno-issledovatel'skiy geologorazvedochnyy institut.

O proiskhozhdenii nefti v kamennougol'nykh i permskikh otlozheniyakh Volgo-Ural'skoy oblasti; sbornik statey (Origin of Petroleum in the Carboniferrous and Permian Sediments of the Volga-Ural District; Collection of Articles) Leningrad, Gostoptekhizdat, 1958. 283 p. (Series: Its: Trudy, vyp. 117) Errata slip inserted. 1,500 copies printed.

Ed.: Zinaidy L'vovny Maymin; Exec. Ed.: G.A. Dayev; Tech. Ed.: I.M. Gennad'yeva.

PURPOSE: This book is intended for geologists and geochemists, particularly those interested in questions dealing with the origin, development, and structure of oil deposits.

COVERAGE: This collection of articles deal with the Carboniferous and Permian sediments of the Volga-Ural district and methods of determining possible petroleum source-beds. The lithologic and

geochemical characteristics of the sediments are discussed as are the conditions of oil deposition. The author thanks the following geologists working in the Second Baku area: A.Z. Dubinin, L.P. Zadov, K.B. Ashirov, I.L. Khanin, A.M. Mel'nikov, S.P. Yegorov, and I.A. Shpil'man. Further thanks are extended to Professor M.F. Dvali for his advice and encouragement. References accompany each article.

Origin of Petroleum (Cont.)

Card 3/4

Origin of Petroleum (Cont.) SOV/1897

AVAILABLE: Library of Congress

MM/lsb
6-22-59

POZNER, E. I.

Deceased
C. 1949

USSR/ Chemistry Physical chemistry

Card : 1/1 Pub. 147 - 8/25

Authors : Pozner, E. I., and Biryukova, V. K.

Title : Solubility of salt in the presence of two other salts with common ion. Part 2.

Periodical : Zhur. fiz. khim. 28/7, 1225 - 1227, July 1954

Abstract : Empirical equation for determining the solubility of a salt in the presence of two other salts having a common ion with the latter. The applicability of this empirical equation (introduced by E. I. Pozner) to four and three-salt-systems, connected with a common ion (water), was confirmed by the perfect analogy of the molar fractions of the common ion. Six USSR references (1932 - 1954). Table; graphs.

Institution : Acad. of Sc. Uzb-SSR, Chemical Institute, Tashkent

Submitted : July 25, 1953

ZHDANOV, V.M.; LEBEDEV, D.D.; DADASH'YAN, M.A; PROKHOROVICH, Ye.V.; POZNIAK, A.P.; FADEYEVA, L.L.

Clinical and epidemiological observations of children inoculated with measles tissue vaccine. Pediatriia 38 no.6:62-66 Je '60. (MIRA 13:12)

(MEASLES)

POZNIAK, L.

"Compulsory deliveries of slaughter cattle in the year 1953", p. 1, (GOSPODARKA MIESNA, Vol.5, No. 1, January, 1953, Warszawa, Poland)

SO: Monthly List of East European Accessions, L.C., Vol. 3, No. 4, April, 1954

POZNIAK L.A.

1257* Russian Radiographic Investigation of Intercrystalline Non-Homogeneity of Sulfur and Phosphorus in Welded Joints Radiograficheskoe issledovanie vnutrikristallitnoi neodnorodnosti sery i fosfora v svarnykh shvakh. B. A. Movchan and L. A. Pozniak. *Avtomaticheskaia Svarka*, v. 9, no. 4 July-Aug. 1956, p. 76-81.

Effect of cooling and heating on the crystalline non-homogeneous distribution of S in the welding joint metal.

PORTYCH, I.; OKONIEWSKI, R.; RUSZKIEWICZ, W.; POZNIAK, Z.; SUCHOZEBRSKA, E.; BISKUPSKI, E.

Healing of experimental false joints. Chir. narz. ruchu ortop. polska 26 no.6:665-672 '61.

1. Z Kliniki Ortopedycznej AM w Gdansku Kierownik doc. dr A. Senger.
(PSEUDARTHROSIS exper)

POZNIAK, Z.; PORTYCH, L.; OKONIEWSKI, R.; RUSZKIEWICZ, W.; SUCHOZEBRSKA, E.

Comparative histological and radiological studies on calluses during the course of fracture healing with special reference to false joints. Chir. narz. ruchu ortop. polska 26 no.6:673-685 '61.

1. Z Kliniki Ortopedycznej AM w Gdansku Kierownik: doc. dr A.Senger.
(FRACTURES) (PSEUDARTHROSIS)

POZNIAK, Zbigniew; DUNAJ, Weronika

Attempted acceleration of union of fractured bones in the light of modern views. Chir. narzad. ruchu ortop. pol. 28 no.3:275-284 '63.

1. Z Kliniki Ortopedycznej w Gdansku Kierownik: doc. dr A. Senger.

(FRACTURES) (THERAPEUTICS)

POZHIAK, Zbigniew

Results of the treatment of clavicular fractures by figures-of-eight dressing and Dessault's dressing. Chir. narzad. ruchu ortop. Pol. 28 no.7:1029-1031 '63

1. Z Kliniki Ortopedycznej Akademii Medycznej w Gdańsku (Kierownik: doc. dr. A. Senger).

POZNIC, Miroslav; TOMIC, Ljubisa; ZDRAVKOVIC, Dragan; MILENKOVIC, Miodrag; DIKIC, Ljubinko

Treatment of sequelae after deep burns. Srpski arh. celok. lek. 88 no.10:973-979 O '60.

1. II Hirurska klinika Medicinskog fakulteta Univerziteta u Beogradu. Upravnik: prof. dr Vojislav K. Stojanovic.

(BURNS surg) (SKIN TRANSPLANTATION)

POZNIC, Miroslav, [illegible]

First aid in cases of maxillo-facial injuries. Med. glas. 18 no.10:328-331 O '64.

1. Stomatohirurska klinika Stomatoloskog fakulteta u Beogradu (Upravnik: prof. dr. Lj. Bakovic).

POZNIC, M.

Indications for alloplastic surgery in various deformities of the face. Srpski arh.celok.lek. 83 no.2:197-202 Feb. '55.

1. Klinika za plasticnu hirurgiju Vojno-medicinske akademije JNA (Jugoslavenske Narodne Armije) u Beogradu. Nacelnik:pukovnik doc. dr Vinko Arneri.

(SURGERY, PLASTIC,
alloplastic substances, face deform.,indic.(Ser))
(FACE, surg.
plastic alloplastic substances, indic.(Ser))

POZNIC, M.; VASILJEVIC, D.; BALJOZOVIC, A.

Severe injury of the face with an ax. Srpski arh. celok. lek. 83 no.7-8:860-863 July-Aug 55.

1. I Hirurska klinika Medicinskog fakulteta u Beogradu. Upravnik: Milivoje Kostic. II Hirurska klinika Medicinskog fakulteta u Beogradu. Upravnik: Vojislav Stanojevic.

(FACE, wds & inj.
ax-inflicted, surg. (Ser))
(WOUNDS AND INJURIES,
face, ax-inflicted, surg. (Ser))

L 1167-66

ACCESSION NR: AP5025449 YU/0015/64/000/010/0328/0331

AUTHOR: Poznic, Miroslav (Doctor, Professor)

TITLE: First aid in maxillo-facial injuries

SOURCE: Medicinski glasnik, no. 10, 1964, 328-331

TOPIC TAGS: injury, first aid

ABSTRACT: General discussion of the basic principles to be observed in maxillo-facial wounds and lesions such as those sustained in accidents or injuries from firearms: preservation of the airway, taking care that the maxillo-facial injuries do not conceal some vital injuries and setting the bones for rapid transportation to hospital for surgery. Orig. art. has: 6 figures.

ASSOCIATION: Stomatohirurska klinika stomatoloskog fakulteta, Belgrade (Clinic of Dental Surgery of Stomatology Faculty)

SUBMITTED: 00	ENCL: 00	SUB CODE: LS
NR REF SOV: 000	OTHER: 006	JPRS

Card 1/1

POZNIC, Miroslav, Asist.dr.

Primary plastic surgery in severe injuries of the hand. Srpski, arh.celok.lek. 87 no.10:1274-1276 Oct. 54

1. I Hirurska klinika Medicinskog fakulteta u Beogradu. Upravnik: prof. dr Malivoje Kostic.

(WOUNDS AND INJURIES,
hand,srug.,plastic reconstructionin severe damages)
(HAND, wounds and injuries,
surg.,plastic reconstruction in severe damages)

POZNIC, Miroslav, Asist., dr.; KOVACEV, Danica, asist., dr.; PAVLOVIC, Dejan, asist., dr.

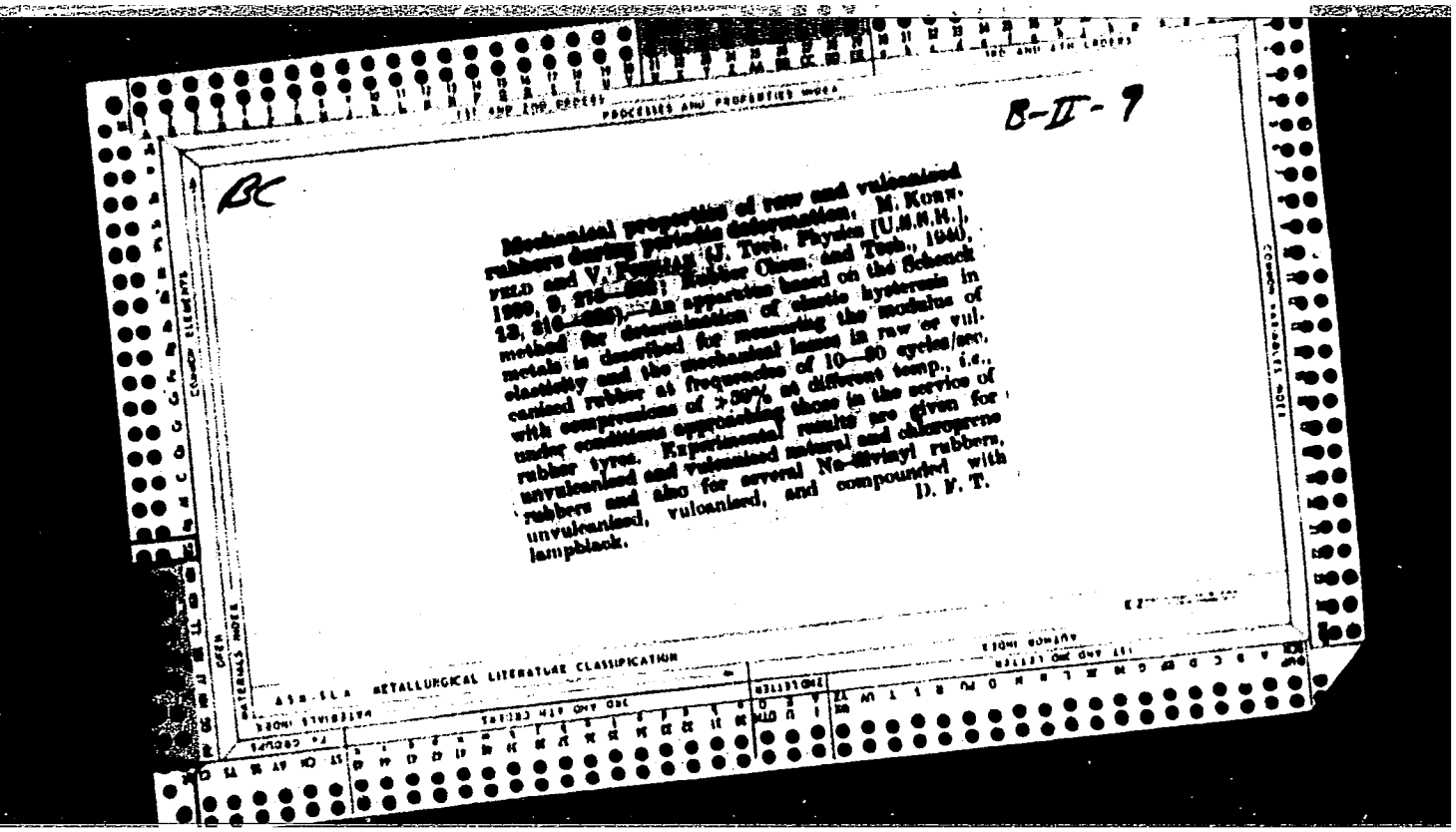
Rank's technic of tendoplasty. Voj. san. pregl., Beogr. 13 no.3-4:200-204 Mar-Apr 56.

1. I Hirurska klinika Medicinskog fakulteta u Beogradu. Traumatoloska bolnica u Beogradu.
(FINGERS, surg.
tendoplasty, Rank's technic (Ser))

POLAND, ...

"The Body and Its Treatment," p. 43. (Zdrowie Publishing House, Vol. 10, no. 1/2 Jan/Feb. 1953, Journal)

SO: Monthly List of East European Accessions. Vol. 3, no. 3. Library of Congress. March 1954.



B-II-9

RC

Mechanical properties of raw and vulcanized rubbers during periodic deformation. M. Kosv. VELD and V. Pasynkov. J. Tech. Physics [U.S.S.R.], 1939, 9, 276—284; Rubber Chem. and Tech., 1940, 13, 210—220).—An apparatus based on the Schenck method for determination of elastic hysteresis in metals is described for measuring the modulus of elasticity and the mechanical losses in raw or vulcanized rubber at frequencies of 10—30 cycles/sec. with compressions of >50% at different temp., i.e., under conditions approaching those in the service of rubber tyres. Experimental results are given for unvulcanized and vulcanized natural and chloroprene rubbers and also for several Na-divinyl rubbers, unvulcanized, vulcanized, and compounded with lampblack. D. F. T.

1. POGREBNIY, S.

2. USSR (600)

3. Alfalfa - Ukraine

7. Summer plantings of alfalfa in southern Ukraine.
Zhlopkovodstvo no. 7, 1952.

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

POZNOKHIRIN, F. L.

Alfalfa

Summer sowing of alfalfa with newly-gathered seed. F. L. Poznokhirin. Korm. baza 3, No. 7, 1952.

9. Monthly List of Russian Accessions, Library of Congress, September 1952/1953, Uncl.

1. POZNOKHILI, P. L.

2. USSR (600)

4. Alfalfa

7. Sowing alfalfa in summer with newly harvested seeds.
Dost sel'khoz. no. 4, 1952

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

[illegible], T. L.

Letniye posevy lyutserny v Askanii-Nova (Summer Sowing of Alfalfa in Askaniya-Nova) [illegible], MOSKVA, 1953, 56 p.

The brochure describes experience of the "Askaniya-Nova" Scientific Research Institute farm in obtaining high alfalfa crops by the method of summer sowing. The brochure also gives and account of the following problems: the significance of alfalfa in crop rotation in the dry rayons of Southern, and Southeastern USSR, the preference of summer sowing, to spring sowing of alfalfa, and describes the agricultural techniques which yielded high alfalfa crops with summer sowing on the "Askaniya-Nova" farm.

The brochure is intended for leading workers of rayon machine-tractor stations, and kolkhozes.

SO: Sovetskiye Knigi (Soviet Books), No. [illegible], 1953, Moscow, (U-6472)

1. POZNOKHIRIN, F. L.

2. USSR (600)

4. Alfalfa

7. Biological characteristics of summer sowing of alfalfa. Agrobiologiya no. 1, 1953.

9. Monthly List of Russian Accessions, Library of Congress, May 1953. Unclassified.

POZNOKHINN, F. L.

Alfalfa

Summer sowings of alfalfa and proso millet together. Dokl. Akad. sel'khoz. 18, No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, June 1953, Uncl.

POZNOKHIRIN, F.L., Cand Agr Sci—(diss) "Cultivation of lucerne [illegible] the fodder crop-rotations in the Southern Ukraine." Odessa, 1957. 16 pp (Min of Agr USSR. Odessa Agr Inst), 100 copies. [illegible] (KL, 36-57, 113)

POZNOKHIRIN, F.L.

Practical problems in increasing the productivity of labor in livestock farming. Zhivotnovodstvo 20 no.5:17-23 My '58. (MIRA 11:5)

1. Zaveduyushchiy otdelom ekonomiki Ukrainskogo instituta zhivotnovodstva stepnykh rayonov.
(Kherson Province--Stock and stockbreeding)
(Zaporozh'ye Province--Stock and stockbreeding)

POZNOKHIRIN, Fedor Lukich, kand. sel'khoz.nauk; RABINOVICH, V.M., kand. sel'khoz. nauk, red.; BLANINA, L.F., red.; GAVRILOV, V.N., red.;KVITKA, S.P., tekhn. red.

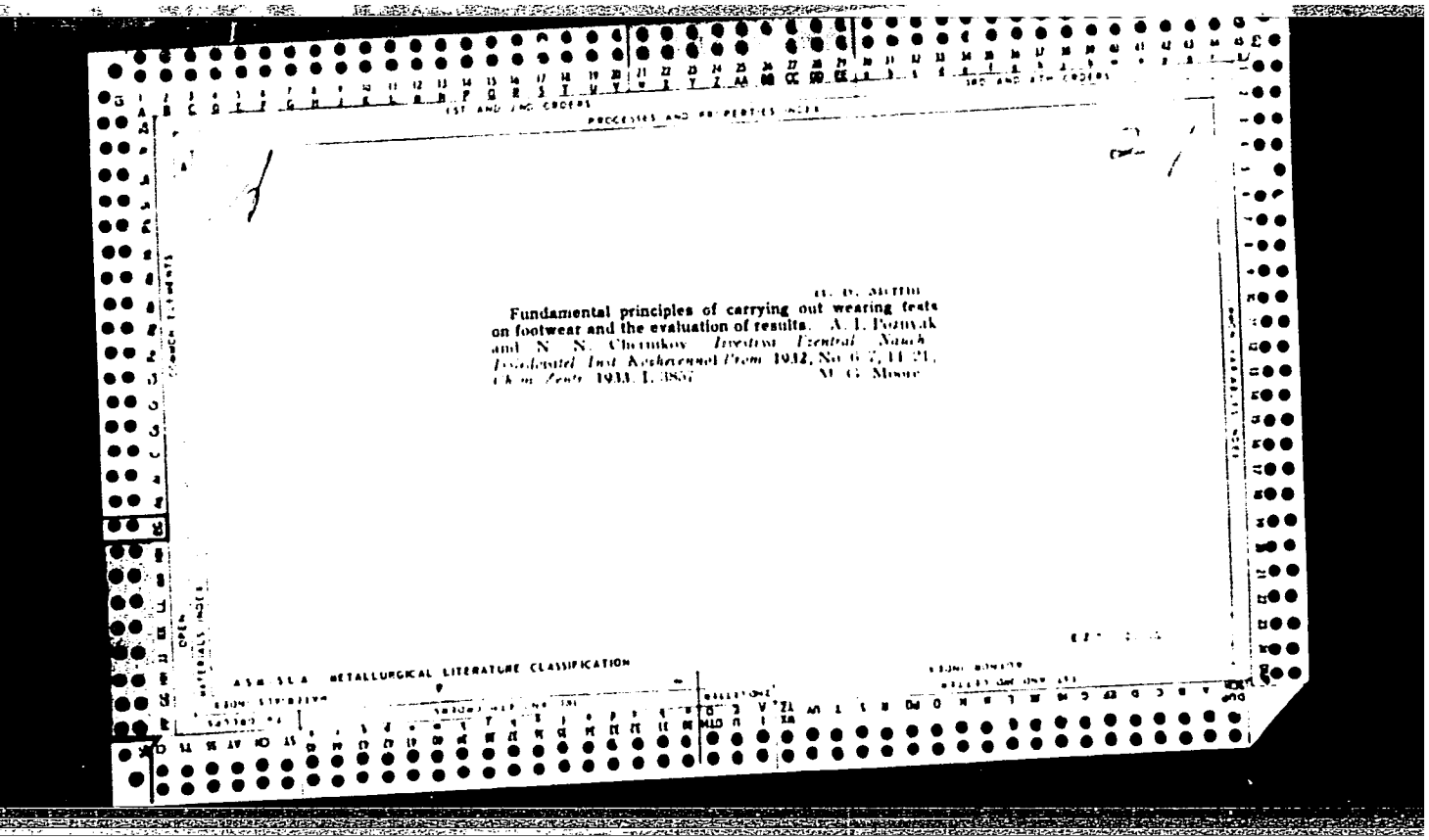
[Alfalfa growing in the steppe] Kul'tura liutserny v stepi. Kiev, Izd-vo Ukrainskoi akad. sel'khoz.nauk, 1961. 242 p. (MIRA 15:2)

(Alfalfa)

POZNUKHOV, N.

Green light to automation. Za bezop.dvizh. 5 no.12:1-2 D '62.
(MIRA 16:1)

1. Zamestitel' nachal'nika Otdela regulirovaniya ulichnogo dvizheniya Gosudarstvennoy avtomobil'noy inspektsii UOOP Moskovskogo gorodskogo ispolnitel'nogo komiteta Moskovskogo gorodskogo soveta deputatov trudyashchikhsya.
(Automation) (Traffic engineering)



Fundamental principles of carrying out wearing tests on footwear and the evaluation of results. A. I. Poznyak and N. N. Chernikov. *Investiva Tsentral. Nauch. Issledovatel. Inst. Kozhevennoi Prom.* 1932, No. 6-7, 11-21; *Chem. Zentr.* 1933, I, 3857. M. G. Mason

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

POZNYAK, A.

The path toward heroic deeds. Rab.i sial. 36 no.5:5 My '60.
(MIRA 13:10)

(Lozno District--Swine--Feeding and feeds)

POZNYAK, A.A.

Desulfuration of cupola cast iron with magnesium in the production of low bessemer steel. Mashinostroenie no.1:113-114 Ja-F '63. (MIRA 16:7)

(Desulfuration)

POZNYAK, A.B., aspirant (Kiyev)

Duration of the use of obturators and their construction in the various forms of cleft palate. Probl. chel.-lits. khir. no.1:94-96 '65. (MIRA 18:10)

KRAVCHUK, L.S.; POZNYAK, A.L.; YEREMEYEV, B.V.

Electron paramagnetic resonance signal in a bright blue modification of anhydrous copper formiate. Zhur. strukt. khim. 6 no. 4:645-647 Jl-Ag '65 (MIRA 19:1)

1. Institut fiziko-organicheskoy khimii AN BSSR i Belorusskiy gosudarstvennyy universitet imeni V. I. Lenina, Minsk. Submitted December 7, 1964.

SHAGISULTANOVA, G.A.; NEOKLADNOVA, L.N.; POZNYAK, A.L.

Electron paramagnetic resonance study of photochemical reactions in complex oxalates. Dokl. AN SSSR 162 no.6:1333-1335 Je '65. (MIRA 18:7)

1. Belorusskiy gosudarstvennyy universitet im. V.I.Lenina. Submitted December 1, 1964.

L 15249-65 EWT(l)/EEC(t) Peb IJP(c)/BSD/AFWL/ASD(a)-5/SSD/AS(mp)-2/RAEM(i)/
RAEM(c) GG

ACCESSION NR: AP4048745 S/0051/64/017/005/0734/0736

AUTHORS: Kats, M. L.; Nikol'skiy, V. K.; Pisarevskiy, A. N.; Poz-
nyak, A. L.; Semenov, B. Z.

TITLE: Optical absorption and electron paramagnetic resonance in alkali halide crystals activated with nickel

SOURCE: Optika i spektroskopiya, v. 17, no. 5, 1964, 734-736

TOPIC TAGS: alkali halide, optical absorption, electron paramagnetic resonance, activated crystal, microwave absorption

ABSTRACT: The electron paramagnetic resonance spectra of single-crystal KCl and NaCl activated with $NiCl_2$ were measured as functions of the activator concentration and compared with the optical absorption spectra. The purpose of the research was to ascertain the form in which the nickel enters into the NaCl crystal, whether the $NiCl_2$ phase is present in such phosphors grown from a melt, and what opti-

Card 1/3

cal bands correspond to this phase. The EPR spectra were measured at room temperature and ~9700 Mcs with the aid of a spectrometer with high frequency modulation and automatic frequency control against the working cavity. The crystals measured 5 x 5 x 5 mm and were grown from the melt by the Kiropoulos method. The activator concentration ranged from 0.5 to 1.0 mol.%. The results show that no EPR is observed in NaCl-Ni crystals with low activator concentration. The threshold concentration was 0.03 mol.% for NaCl and more than 0.06 % for KCl. The microwave absorption increased noticeably with increasing activator concentration. In NaCl-$NiCl_2$ crystals with high activator concentration there is observed an $NiCl_2$ phase corresponding to an optical absorption band with maximum at 460 nm. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: None

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001342820015-5"

L 15249-65
ACCESSION NR: AP4048745

0

ENCL: 00

SUBMITTED: 16Jan64

OTHER: 005

SUB CODE: OP, IC

NR REF SOV: 004

Card 3/3

POZNYAK, A.L.; TADEUSH, V.N.; IL'YUKEVICH, L.A.

Electron paramagnetic resonance of copper complex compounds in the 8 mm. range. Zhur.strukt.khim. 6 no.5:779-781 S-O '65. (MIRA 18:12)

1. Belorusskiy gosudarstvennyy universitet imeni V.I.Lenina. Submitted March 1, 1965.

IL'YUKEVICH, L.A.; POZNYAK, A.L.; SHAGISULTANOVA, G.A.

Electron paramagnetic resonance in some copper compounds. Zhur. strukt.khim. 4 no.6:919 N-D '63. (MIRA 17:4)

1. Belorusskiy gosudarstvennyy universitet imeni Lenina.

POZNYAK, A.P.; GROZDOVA, T.N.

Use of respirators for artificial respiration in the asphyxia of newborn infants in Moscow meternity homes. Pediatriia 41 no.11:17-21 N'62 (MIRA 17:4)

1. Iz Moskovskogo gorodskogo otdela zdravookhraneniya (zav. - N.S. Lapchenko) i laboratorii eksperimental'noy fiziologii po ozhivleniyu organizma (zav. - prof. V.A. Negovskiy) AMN SSSR.

POZNYAK, A.P.

New organizational forms of work in children's polyclinics. Pediatriia 23 no. 5:6-9 My '60. (MIRA 14:1)
(HOSPITALS—OUTPATIENT SERVICE) (PEDIATRICS)

LEBEDEV, D.D.; DADASH'IAN, M.A.; BADIRYAN, L.G.; POZNYAK, A.P.

Shortening the period of isolation in chickenpox. Pediatriia 38 no.6:75-77 Je '60. (MIRA 13:12)
(CHICKENPOX)

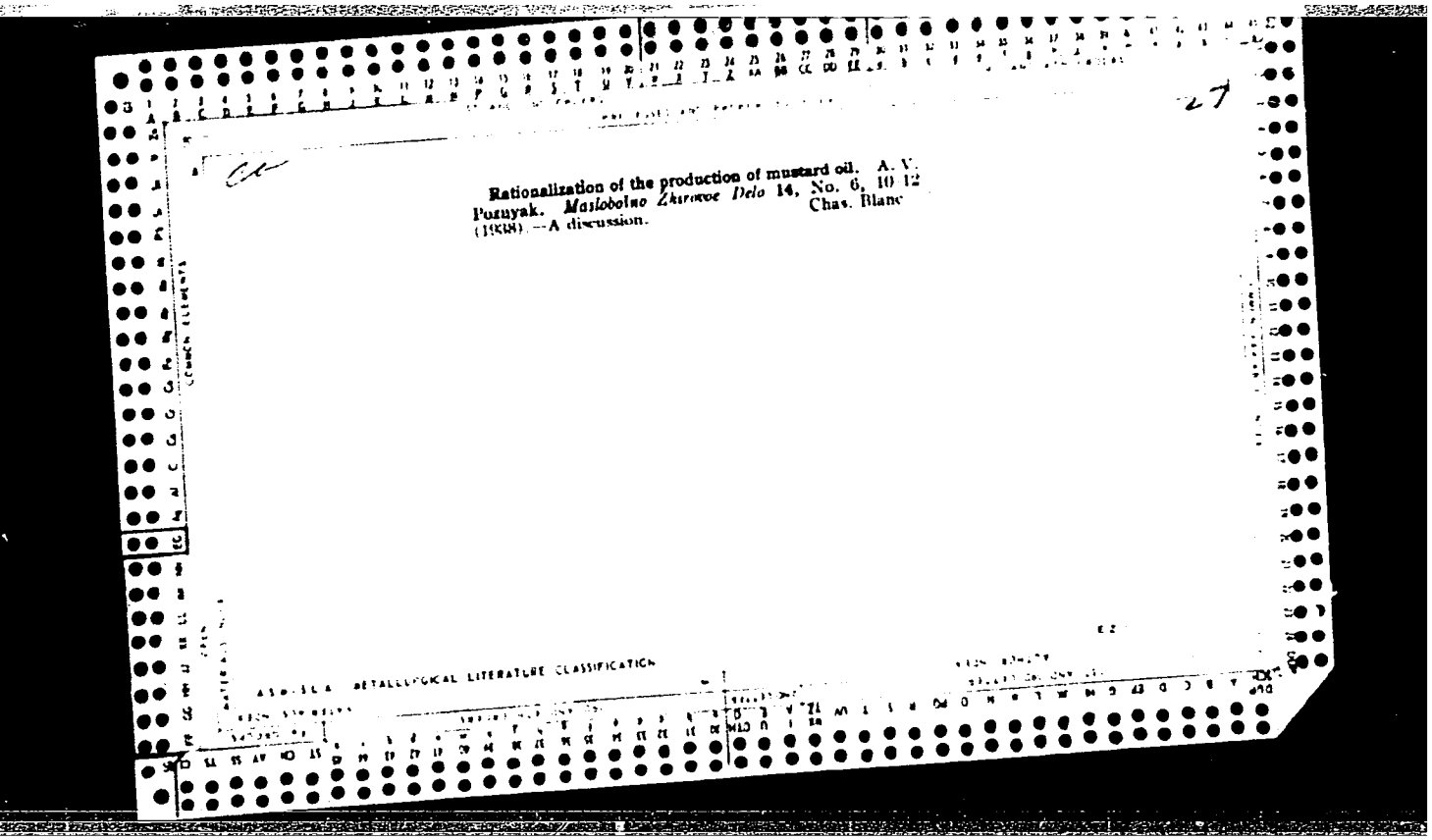
POZNYAK, A.P. (Moskva)

Loose swaddling of newborn infants employed in Moscow maternity homes. Sov. zdrav. 19 no.6:33-35 '60. (MIRA 13:9)

1. Glavnyy pediatr Moskvy.
(INFANTS (NEWBORN))

POZNYAK, A.P.

New procedures in caring for children ill with dysentery. Vop.okh. mat. i det. 1 no.4:75-79 Jl-Ag '56. (MLRA 9:9)
(DYSENTERY)



Rationalization of the production of mustard oil. A. V. Puzuyak. *Maslobolno Zhirovoe Delo* 14, No. 6, 10-12 (1938).—A discussion. Chas. Blanc

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

POZNYAK, E.G., kand.fiz.-matem.nauk

Geometry in the large. Priroda 51 no.12:52-53 D '62. (MIRA 15:12)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Geometry, Differential)

POZNYAK, E. G. Cand. Physicomath Sci.

Dissertation: "Infinitesimal Deflections of the Surfaces of Zero Curvature."

22/11/50
Sci. Res. Inst. of Mathematics, Moscow State U. imeni. M. V. Lomonosov.

SO Vecheryaya Moskva
Sum 71

Poznyak, E. G.

Poznyak, È. G. Infinitesimal deformations of polygonal troughs. Doklady Akad. Nauk SSSR (N.S.) 78, 205–207 (1951). (Russian)

Let Π', Π'' be two parallel planes in 3 dimensions and for $i=1, 2, \cdots, n$, let S_i be a piece of ruled surface, with generators parallel to these planes, which is bounded by two generators and two curved edges L_i, L_{i+1}. By gluing the S_i along the curved edges in circular order, the author obtains a surface whose boundary consists of two plane polygons. He terms this surface a polygonal trough. In the case $n=3$ he finds that the trough is rigid under infinitesimal deformations whose field of translation is single-valued on the edges. For general n, he studies rigidity under infinitesimal deformations for which the field of rotation is also single-valued on the edges. He finds that rigidity in this sense is equivalent to the existence of at least two sections of the trough by planes parallel to Π', Π'' which define nonsimilar polygons of nonzero area. Proofs are omitted.

L. C. Young (Madison, Wis.).

Source: Mathematical Reviews, Vol 12 No. 10

POZNYAK, YE.G.

USSR/Mathematics - Surface Deformations

May/Jun 53

"Infinitely Small Bucklings of Trough-like Channels," E. G. Poznyak, Moscow

Matemat Sbornik, Vol 32(74), No 3, pp 681-692

Gives an expanded exposition of results previously presented by the author in a short note ("Infinitely Small Bucklings of Multi-angular Channels," DAN SSSR, Vol 78, No 2, 205-207, 1951). A multi-angular channel is a surface X obtained by a successive joining together of regular cylindrical surfaces X_i (i=1,..,m) each of which is bounded by two of its own rectilinear generatrices and two curves L_{1i} and L_{2i}. Shows that the phenomenon of rigidity holds for surfaces partially defined all together, without any assumption as to the analyticity of both surfaces considered and also as to the deformation fields.

POZNYAK, E.G.

Call Nr: AF 1108825

Transactions of the Third All-union Mathematical Congress (Cont.) Moscow, Jun-Jul '56, Trudy '56, V. 1, Sect. Rpts., Izdatel'stvo AN SSSR, Moscow, 1956, 237 pp.

Card 53/80

POZNYAK, Ye. G. CARD 1/1 PG - 793

SUBJECT USSR/MATHEMATICS/Geometry
AUTHOR POZNJAK E.G.
TITLE Approximation of the infinitely small deformations of the surfaces with the curvature zero.
PERIODICAL Doklady Akad.Nauk 110, 511-514 (1956)
reviewed 5/1957

The field of velocity of an arbitrary infinitely small deformation of the non-plane surface S with zero curvature on every rectilinear generator of S is at the same time the field of velocity of the motion of this generator. This earlier result of the author (Mat.Sbornik,n.Ser. 32, 681 (1953)) induces him to conjecture that the fields of velocity of the infinitesimal deformations of S can be approximated by the fields of velocity of the infinitesimal deformations of certain prismatoids S_n which approximate the surface S. For a simply connected piece of an arbitrary surface with zero curvature the possibility of this approximation is proved. Besides the approximation of infinitely small deformations of polygonal grooves is investigated. The groove is a surface being homeomorphic to the torus which is pasted of cylinders the generators of which run parallel to a fixed plane. With approximative methods the total manifold of the infinitely small deformations of such grooves is determined.

INSTITUTION: Lomonossov University, Moscow.

POZNYAK, E.G.

Example of a closed surface having a singular point and a denumerable fundamental system of infinitesimal bendings. Usp.mat.nauk 12 no.3:363-367 My-Je '57. (MIRA 10:10)
(Surfaces)

VEKUA, Il'ya Nestorovich; BOYARSKIY, B.V., red.; POZNYAK, E.G., red.; TUMARKINA, N.A., tekhn.red.

[Generalized analytical functions] Obobshchennye analiticheskie funktsii. Moskva, Gos.izd-vo fiziko-matem. lit-ry, 1959. 628 p. (MIRA 12:8)
(Functions, Analytic)

POZNYAK, E.G.

Examples of regular metrics on a sphere and in a circle unrealized in a class of twice continuously differentiable surfaces. Vest.Mosk.un.Ser. 1: Mat., mekh. 15 no.2:3-5 Mr-Ap '60. (MIRA 13:8)

1. Kafedra matematiki fizicheskogo fakul'teta Moskovskogo universiteta.

(Surfaces)

IL'IN, Vladimir Aleksandrovich; POZNYAK, Eduard Genrikhovich; TIKHONOV, A.N., red.; SVESHNIKOV, A.G., red.; SHESHMAREV, I.A., red.

Fundamentals of mathematical analysis] Osnovy matematicheskogo analiza. Moskva, Nauka, 1965. 571 p. (Kurs vysshei matematiki i matematicheskoi fiziki, no.1) (MIRA 18:9)

YEFIMOV, N.V.; POZNYAK, E.G.

Some transformations of the basic equations in the theory of surfaces. Dokl. AN SSSR 137 no.1:25-27 Mr-Ap '61. (MIRA 14:2)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova. Predstavleno akademikom I.G.Petrovskim.
(Surfaces)

YEFIMOV, N.V.; POZNYAK, E.G.

Generalization of the Hilbert theorem concerning surfaces of constant negative curvature. Dokl. AN SSSR 137 no.3:509-512 Mr '61. (MIRA 14:2)

1. Moskovskiy gosudarstvennyy universitet im.M.V.Lomonosova. Predstavleno akademikom P.S.Aleksandrovym.
(Surfaces)

POZNYAK, E.G.

Nonrigid closed polyhedrons. Vest.Mosk.un.Ser.1: Mat., mekh. 15 no.3:14-19 My-Je '60. (MIRA 13:10)

1. Kafedra matematiki fizicheskogo fakul'teta Moskovskogo universiteta.

(Polyhedra)

S/740/62/000/007/003/004

AUTHOR: Poznyak, E. L.

TITLE: On the stability of rotors endowed with anisotropic properties.

SOURCE: Akademiya nauk SSSR. Institut mashinovedeniya. Problemy prochnosti v mashinostroyenii. no.7. 1962, 58-74.

TEXT: The stability of a rotor under various kinds of action by non-conservative forces is examined. All forces are assumed to be linear functions of the displacements, velocities, and accelerations; the rotor is assumed to be rigidly attached to a drive engine which exerts a moment sufficient to ensure the maintenance of a constant angular velocity of rotation of the rotor. The anisotropy investigated is that introduced by the particular design features of the given rotor bearings and the driveshaft, as well as by the applicable characteristics of the forces that arise in the motion of the rotor. The analysis stems from the approximate treatment of this problem by D.M.Smith (Roy.Soc., Proc., v.A142, no. 846, 1933). The rotor is regarded as an ideally balanced disk of mass M, placed at the center of a massless circular shaft with rigidity c, and rotating at a constant angular velocity. The ends of the shaft are viewed as supported by two identical massless flexible bearings which have different rigidities along two principal directions. The bearings are imagined as moving with an x-wise velocity u and a y-wise velocity y relative to a fixed system of coordinates; meanwhile the rotor moves within the moving system of the bearings while translating along with the bearings. The rotation of the shaft

Card 1/3

evokes within it isotropic internal-friction forces that are proportional to the velocity of displacement of the disk relative to axes which revolve together with the shaft and translate with its bearings. No external friction forces, arising in the translation of the bearings, are taken into consideration. The differential equations of motion and the force equations lead to a sixth-order equation relative to the damping coefficient; application of the Routh-Gurvits stability discriminant is so cumbersome that construction of the Vyshnegradskiy diagram in the plane of some two parameters appears preferable. Stability boundaries are found and compared with D.M.Smith's approximate findings (reference cited in Card 1/3). The effect of external bearing friction is examined separately. A second analysis investigates the case of an unbalanced disk, placed at the midpoint of a shaft which is supported by two absolutely rigid bearings and which has two different flexural rigidities along two principal directions. It is shown that the uniform rotation of such a shaft is characteristic of a non-conservative system in the presence of restoring forces alone (in the absence of such forces as external and internal friction, circulating forces, etc.). The range of angular velocities in which the disk performs a reverse synchronous precession with finite amplitude is shown. It is demonstrated that a shaft with two different rigidity values produces two differently constituted instability regions, but that these two regions may fuse into one if the external friction forces are small. In addition to the anisotropy caused by peculiarities of the rotor design and its bearings, the effect of the anisotropy derived from the properties of the forces that arise in the

Card 2/3

motion of the rotor in a rotating hydrodynamic or electromagnetic field is analyzed. The stability of the system of equations of motion can be investigated by ordinary methods. However, in order to avoid the complexity of such an approach, the effect of each type of force is first analyzed separately. The forces arising in the rotor as a result of displacement, rate, and second rate are reduced to a special form by subtracting the ordinary elastic, damping, and inertial forces appearing therein. The components of the resulting special forces are found by a tensor approach similar to that set forth by the author (Akad.n.SSSR, Izv., Otd.tekhn.nauk, "Mekhanika i mashinostroyeniye," no.4, 1960). The newly defined "circulational forces" employed in this tensor approach are understood to be at all times perpendicular to the respective displacement, velocity, and acceleration vectors. It is shown that the circulational forces of zeroth order are nonconservative. The Routh-Hurwitz criterion is applied to the characteristic equation of such a system, and the dependence of the stability of the system on the damping forces and their anisotropy is manifested. It is of interest to note that in certain conditions the circulational forces may stabilize a system which, under the action of potential forces alone, would be unstable, e.g., when a strong magnetic force field acts on a rotor or when a significant longitudinal force obtains. There are 7 figures and 12 references (8 Russian-language Soviet and 4 English-language).

ASSOCIATION: None given.

24-5-13/25

AUTHOR: Poznyak, E. L. (Moscow)

TITLE: On the stability of shafts beyond the critical rotation speed. (Ob ustoychivosti valov za kriticheskimi skorostyami vrashcheniya).

PERIODICAL: "Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk", (Bulletin of the Ac.Sc., Technical Sciences Section), 1957, No.5, pp.104-107 (U.S.S.R.)

ABSTRACT: Internal friction is at present being taken into consideration on the basis of two hypotheses. Focht assumes that there is proportionality between the internal friction forces and the deformation speed so that the energy loss during a cycle of forced oscillations is a linear function of the frequency, a hypothesis which is not confirmed by experiment. According to another hypothesis the energy loss per cycle does not depend on the frequency but only on the amplitude of the deformation. External friction is assumed as being a linear function of the absolute speed of displacement. Application of the hypothesis of Focht to whirling shafts (2 and 3) leads to the conclusion that internal friction displaces the instability boundary further away from the critical speed, whilst on the basis of the second mentioned hypothesis, F.M. Dimentberg (4) concludes

Card 1/3

On the stability of shafts beyond the critical rotation speed. (Cont.) 24-5-13/25

that if the internal friction is slight, the shaft will not lose its stability at any speed, whilst if the internal friction is large, the shaft will lose stability at a speed equalling the critical one. Experimental data do not confirm fully these conclusions and the stability of shafts may also depend on the magnitude of the unbalance, the position of the shaft, the magnitude of the initial impulse etc. Chayevskiy, M.I. (5 to 9) has attempted to explain the divergence between theoretical and experimental results, using the second mentioned hypothesis relating to internal friction, namely, that the energy loss during the cycle does not depend on the frequency and,with one exception,he assumes a quadratic dependence of the energy loss on the deformation. The results obtained by Chayevskiy et alii indicate that the stability of vertical and horizontal shafts differ from each other and depends on the eccentricity; horizontal shafts may lose stability at speeds even below the critical speed. The author of this paper criticises some of the conclusions arrived at by Chayevskiy and his team and concludes that for elucidating the divergence between experimental data and theoretical conclusions it is necessary

Card 2/3

On the stability of shafts beyond the critical rotation speed. (Cont.) 24-5-13/25

to change to a more accurate hypothesis on internal friction, particularly as regards the dependence of the energy loss per cycle on the frequency, the magnitude of the static stresses etc. and also to change over from investigating the stability "in a small range" to studying the stability "on a larger scale", i.e. to change over to non-linear differential equations.
There are 2 figures and 11 references, 8 of which are Slavic.

SUBMITTED: December 18, 1956.

AVAILABLE:

Card 3/3

POZHYAN, E.L., Cand Tech Sci—(diss) "Fluctuations and stability of the rotating iron core in a magnetic field. (Application to rotors of electric engines)." Los, 1958. 11 pp (Min of Higher Education USSR. Len Order of Lenin Power Engineering Inst), 150 copies (KL,41-58, 127)

Poznyak, E L.

18(7); 25(2) PHASE I BOOK EXPLOITATION SOV/2561

Akademiya nauk SSSR. Institut mashinovedeniya

Problemy prochnosti v mashinostroyenii, vyp. 1 (Problems of Strength in Machinery Construction, Nr. 1) Moscow, Izd-vo AN SSSR, 1958. 105 p. 3,000 copies printed.

Resp. Ed.: S.V. Serensen, Academician, Academy of Sciences, UkrSSR; Ed. of Publishing House: V.I. Mitin; Tech. Ed.: O.M. Gus'kova.

PURPOSE: This collection of articles is intended for scientific research workers and engineers concerned with problems of vibrations in revolving shafts.

COVERAGE: This collection of articles deals with vibrations in rotary motion. Topics discussed include the influence of internal friction on the vibrational stability of revolving shafts, nonlinear vibration of shafts beyond critical speeds, flexural unsteady-state vibrations of a flexible rotor with

Card 1/4

two equal unbalanced masses, and flexural unsteady-state vibrations of flexibly supported rotors, taking the gyroscopic effect into account. No personalities are mentioned. References follow several of the articles.

TABLE OF CONTENTS:

of internal friction in rotating shafts at speeds of rotation above the critical. The author analyzes the rotation of a single-disk weightless shaft vibrating at a frequency low enough to exclude the possibility of deviation of the disk.

Gusarov, A.A. Flexural Unsteady-state Vibrations of a Flexible Rotor With Two Equal Unbalanced Masses 54

The author uses a previously obtained solution for the analysis of the transition through critical speeds of a shaft with two disks of equal weight, placed equidistant from the supports, and having differently located disbalance vectors. Two cases are discussed; 1) when the eccentricities of the disks are equal, and 2) when they are unequal. The use of the results for the dynamic balancing of flexible rotors with two equal masses is explained.

Grobov, V.A. Unsteady-state Flexural Vibrations of Elastically Supported Rotors, Taking the Gyroscopic Effect Into Account 88

This article is an investigation of the relationship between gyroscopic effect and unsteady-state transverse vibrations of rotors with flexible shafts on elastic bearings during transition through critical speeds. Two cases are treated, one in which the elastic supports have a linear characteristic with equal or different radial rigidity, and one in which one support is rigid, the other is elastic with a nonlinear characteristic, and the coefficients of radial rigidity are the same.

AVAILABLE: Library of Congress

AUTHOR: Poznyak, Eduard L'vovich, Candidate of Technical Sciences, Scientific Worker of the Scientific Research Institute (NII) SOV/ 161-58-1-8/33

TITLE: Oscillations of a Rotating Steel Core in a Magnetic Field (Kolebaniya vrashchayushchegosya stal'nogo serdechnika v magnitnom pole)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Elektromekhanika i avtomatika, 1958, Nr 1, pp. 49 - 59 (USSR)

ABSTRACT: In this paper the oscillations of a rotating elastic rotor are investigated taking into account the electromagnetic forces. A simple electromechanical model is considered in order to specify the particular action of the electromagnetic forces. A number of simplifying assumptions are made as they are commonly used in the theory of an elastic shaft and in the pertinent electrical problem. Small oscillations of a massive steel core of a spherical shape in a magnetic field are investigated. The core is supposed to be mounted to a weightless vertical elastic shaft. It is assumed that the shaft bearings are absolutely rigid. The influence of the gyroscopic effect and of the shearing forces are not taken into

Card 1/4

consideration. The core is supposed to rotate with a constant angular velocity. The common flexure- and torsion oscillations are neglected. The displacement of the core is considered to be small in comparison with the dimensions of the shaft and to that of the air gap. Hence the modification of the distribution of the magnetic induction caused by the displacement of the core is not taken into consideration. The first section is concerned with the computation of the forces of magnetic attraction. Formula (2) is deduced and it is shown that at small displacements x and y in comparison to Δ (width of the air gap at the zero position of the core), the forces of attraction are proportional to the displacement. They are oriented in the direction of the displacement, that is to say opposite to the elastic forces. In the second section the oscillations occurring in an isotropic magnetic field are investigated. It is shown that the magnetic field causes a split-up of the critical velocity and an increase of this velocity. The division of the critical velocities takes place into two directions in an analogous manner to the case of a cylindrical elastic shaft rotating on elastic bearings with

a different rigidity. As the center of gravity S does not coincide with the points at which the analogous magnetic forces are applied the amplitudes of the forced oscillations are modified and the phase is shifted. For this reason these points are considered to be coinciding. The investigation of the oscillations in a pulsating magnetic field are the subject of the third section. The mathematical system obtained consists of 2 not coupled inhomogeneous differential equations with periodic factors of a Mathieu-type. Outside of the range of resonance determined by the parameters the motion exhibits a character which is essentially determined by the inhomogeneous factor of the differential equation (which represents the exciting forces). It can be maintained that in this case the forced oscillations have frequencies which are equal to the rotational speed ω , the double field frequency 2Ω and to the frequencies $2\Omega \pm \omega$. In the fourth section the oscillations in a rotating magnetic field are investigated. This case corresponds to that of a stator of a two-pole a. c. machine. The algebraic equation (6) is

Oscillations of a Rotating Steel Core in a Magnetic Field SOV/161-58-1-8/33

deduced, the roots of which represent the eigenfrequencies in the rotating coordinate system. The publication of this article was recommended by the Kafedra elektricheskikh mashin Moskovskogo energeticheskogo instituta (Chair of Electrical Machines at the Moscow Institute of Power Engineering). There are 5 figures and 7 references, 2 of which are Soviet.

ASSOCIATION: NII

SUBMITTED: December 12, 1957

Card 4/4

BOLOTIN, V.V.; MAREYN, N.S.; VINOKUROV, A.I.; POZNYAK, E.L.; IVOVICH, V.A.

Vibration and vibration resistance of conductors of overhead electric power lines. Nauch. dokl. vys. shkoly; energ. no.2: 55-62 '58. (MIRA 11:11)
(Electric lines--Vibration)

8(2)
AUTHOR: Poznyak, Eduard L'vovich, Chief Engineer of the Moscow Hill SOV/161-58-2-16/39

TITLE: Some Problems of the Steel Core Stability in the Magnetic Field (Nekotoryye voprosy ustoychivosti stal'nogo serdechnika v magnitnom pole)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Elektromekhanika i avtomatika, 1958, Nr 2, pp 146 - 152 (USSR)

ABSTRACT: A circular magnetic field with an even number of pairs of poles is investigated. The magnetic field rotates in the counter-clockwise direction at an angular speed Ω. In this field there is a solid steel core of the mass m. It is placed on a vertical weightless elastic shaft having the same bending strength c. The center of gravity of the core, the rotary axis of the shaft and the center of the magnetic field are assumed to coincide at the motionless core. The core is supposed of having come into movement by any accidental impulse. The differential equations for the movement of the center of gravity of the core are recorded in collapsible coordinates u and v that rotate together with the field at the speed Ω.

Card 1/2

Some Problems of the Steel Core Stability in the Magnetic Field

SOV/161-58-2-18/30

The outer and inner friction forces are not taken into account and of the dissipative forces of magnetic origin only those are considered that are proportional to the velocity of displacement. These forces are observed in coordinates that rotate together with the field. The stability of the field is then investigated and it is shown that the movement will be unstable in the case of the rotational speed of the shaft or that of the field or both of them being greater than the critical core velocity and the forces of the external resistance being sufficiently small. In this case, the resistances of magnetic origin and the internal friction forces promote the "tilting" of the oscillations. The energy required is supplied by the primary motor and by the magnetic field. There are 1 figure and 2 Soviet references.

ASSOCIATION: Kafedra elektricheskikh mashin Moskovskogo energeticheskogo instituta (Chair for Electrical Machines of the Moscow Power Engineering Institute)

SUBMITTED: December 12, 1957

Card 2/2

SOV/24-58-10-3/34

AUTHOR: Poznyak, E. L. (Moscow)

TITLE: The Stability of an Iron Core in a Magnetic Field (Ob ustoychivosti zheleznogo serdechnika v magnitnom pole)

PERIODICAL: Izvestiya akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, 1958, Nr 10, pp 12-17 (USSR)

ABSTRACT: The iron core (armature) of a motor or other such machine, supported by a weightless vertical shaft in rigid bearings is considered. The armature and field are assumed to rotate at different (unrelated) speeds; there is an air gap between core and stator. The forces due to the position and to the motion of the rotor, assumed displaced from the symmetrical position by some external perturbation, are considered in relation to Fig.1. The first equation on p 13 gives the force due to position (magnetic), with the magnetic induction given as a function of air gap by Eq.(1); Eqs.(2) and (3) then follow naturally (if the displacements are small). The velocity-dependent forces are then considered, (neglecting all but the surface layers, as the induction in the interior is unknown). The equations for the transverse oscillations are then introduced, and the stability conditions derived as

Card 1/2

The Stability of an Iron Core in a Magnetic Field

Eq.(7). The last page deals with some experimental tests on a motor, of parameters given at the bottom of p 16 (6-pole field, i.e. 3-phase). The paper contains 4 figures and 4 references; 2 of the references are Soviet and 2 are English.

SUBMITTED: December 23, 1957.

POZNYAK, E.L., kand.tekhn.nauk

Theoretical and experimental investigation of vibrations of a steel core in a magnetic field. Izv.vys.ucheb.zav.; mashinostr. no.1:60-77 '59. (MIRA 13:3)

1. Moskovskiy energeticheskiy institut.
(Electric machinery--Vibration)

SOV/24-59-3-4/33

AUTHOR: Poznyak, E. L. (Moscow)

TITLE: The Stability of a Rotating Iron Core in a Magnetic Field

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1959, Nr 3, pp 19-24 (USSR)

ABSTRACT: The problem treated by the same author in Nr 10 for 1958 of this journal is dealt with again; in the earlier treatment the damping forces were assumed to be ones proportional to the speed only. In the new treatment the dissipative forces are assumed to arise from friction, from magnetic (hysteresis) causes, and from induced currents; these forces are assumed to be independent of the amplitude of the oscillation, and to vary in an arbitrary but known way with frequency. The theoretical treatment is merely a reworking of the treatment given in the earlier paper, with the same notation. The rest of the paper deals with examples closely related to those considered in the earlier paper (all the basic parameters are the same). A few experimental results are given at the end of the paper, but the way (if any) in

Card 1/2

The Stability of a Rotating Iron Core in a Magnetic Field

which they confirm the theory is not indicated. The paper contains 6 figures and 1 Soviet reference.

SUBMITTED: September 25 1958.

Card 2/2

83315

S/179/60/000/004/014/027
E191/E181

26.2123

AUTHOR: Poznyak, E.L. (Moscow)

TITLE: The Vibrations of Rotors on Bearings with Mass and Elasticity, Taking into Account the Dynamic Properties of the Oil Film in a Sliding Bearing

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Mekhanika i mashinostroyeniye, 1960, No 4, pp 105-115

TEXT: The behaviour of a rotating journal in a bearing under conditions of hydrodynamic lubrication in the oil film is determined by forces accompanying transverse displacements. Every displacement produces a restoring force and every rate of displacement, a damping force. The force and displacement components are, in each case, related by a tensor with four terms. The restoring force tensor can be resolved into a symmetric and a skew symmetric part. The components of the symmetric tensor are the stiffnesses of the oil film. Together with the displacement vector the symmetric tensor yields the elastic force vector, whose direction does not coincide with the displacement vector. The skew symmetric tensor yields a vector which is always perpendicular to the displacement vector and is therefore sometimes known as the pseudo-gyroscopic force. The

Card 1/7

83315

S/179/60/000/004/014/027
E191/E181

The Vibrations of Rotors on Bearings with Mass and Elasticity, Taking into Account the Dynamic Properties of the Oil Film in a Sliding Bearing

differential equations of the forced transverse vibrations of the centre of the journal around a stationary point are formulated in terms of the principal axes of the oil film stiffness. The damping forces, proportional to the rate of displacement in the oil film, are neglected as insignificant. However, the pseudo-gyroscopic forces have a somewhat similar effect. When they are absent, resonant vibrations occur at shaft speeds corresponding to the natural frequencies based on the journal mass and the two oil film stiffnesses along the principal axes. When the pseudo-gyroscopic forces are present, three cases are distinguished. In the stable case, there are two speeds of resonance. The pseudo-gyroscopic forces do not limit the amplitude at resonance. The two resonant speeds lie just inside the interval between the resonant speeds which apply in the absence of pseudo-gyroscopic forces. Between these resonant speeds, the journal performs an inverse synchronous precession. In the limiting case, the two critical speeds join

Card 2/7

S/179/60/000/004/014/027
E191/E181

The Vibrations of Rotors on Bearings with Mass and Elasticity, Taking into Account the Dynamic Properties of the Oil Film in a Sliding Bearing

into one and the amplitude grows indefinitely. In the unstable case, the journal centre performs a direct synchronous precession. The amplitudes are limited because, in this instance, the pseudo-gyroscopic forces act as damping forces. Maximum amplitudes occur near the single critical speed of the limiting case. At large values of the pseudo-gyroscopic forces, the natural frequencies of the system substantially differ from those derived without taking the pseudo-gyroscopic forces into account. Therein lies the difference compared with ordinary damping forces. When the pseudo-gyroscopic force is positive, the displacements lead the forces in phase, which constitutes another difference compared with damping forces. In modern turbines and turbine generators, operating at the fundamental and several higher critical speeds, the bearing mounting stiffness is commensurate with the stiffnesses of the rotor and the oil film. A representative system is a circular rotor with uniform stiffness and mass distribution supported on two bearings each having a concentrated mass and a stiffness equal for all transverse

S/179/60/000/04/014/027
E191/E181

The Vibrations of Rotors on Bearings with Mass and Elasticity, Taking into Account the Dynamic Properties of the Oil Film in a Sliding Bearing

directions. The oil film stiffness with two principal values lies between the rotor and the bearing mass. The pseudo-gyroscopic forces are ignored for simplification since their qualitative effect has already been discussed. Selecting a rectangular coordinate frame transverse to the rotor axes and coinciding with the principal directions of the oil film stiffness, assuming an unbalance in a single plane uniformly distributed along the rotor, which unbalance is expressed by a certain eccentricity, and considering separately the cases of symmetrical and skew-symmetrical unbalance distributions in relation to the middle of the rotor length, the differential equations of motion of the bearings and of the rotor are set up. The boundary conditions are stated separately for the symmetrical and the skew-symmetrical modes of vibration. The solutions for the forced vibrations along each of the transverse coordinate axes are formulated. The effect of a bearing with mass and elasticity acting through an oil film is equivalent to that of a bearing with two different dynamic stiffnesses in mutually perpendicular directions.

Card 4/7

83315

S/179/60/000/004/014/027
E191/E181

The Vibrations of Rotors on Bearings with Mass and Elasticity, Taking into Account the Dynamic Properties of the Oil Film in a Sliding Bearing

The condition of an indefinite rise of amplitude yields the critical speeds, which are found separately for the symmetrical and the skew-symmetrical modes of vibration. Fig 3 shows in non-dimensional form the natural frequencies derived by this procedure. They are referred to the natural frequency of the same rotor on rigid hinged supports. The frequency is plotted against the non-dimensional stiffness of the oil film with the non-dimensional bearing stiffness as a parameter (both referred to the rotor stiffness). All values apply to a bearing mass equal to 20% of the rotor mass (said to be typical of modern turbo-generator rotors). It is shown that the effect of the oil film on the second critical speed (skew symmetrical mode) is greater than on the first (symmetrical mode). With diminishing film stiffness, both speeds tend to zero. With rigidly mounted bearings, the system becomes a rotor on elastic massless supports. A discussion is given of the case when the equivalent masses of the bearings in the two principal directions are different.

Card 5/7

83315

S/179/60/000/04/014/027
E191/E181

The Vibrations of Rotors on Bearings with Mass and Elasticity, Taking into Account the Dynamic Properties of the Oil Film in a Sliding Bearing

Formulae are given by which the properties of the oil film can be derived from measurements, during rotation, of the absolute displacement of the bearings and the relative displacement of the rotor journals against the bearings. The magnitude and effect of the genuine damping force is as yet unknown. Reference is made to experiments carried out on the balancing rig of the "Elektrosila" works with a rotor weighing 43.4 metric tons on two supports with journals of 40 cm diameter and 40 cm length. The bearing clearance was 0.3 mm. The operating speed of the rotor was to be 3000 r.p.m. The analytically derived critical speeds for the rotor on rigid bearings without oil film were 1250 and 4000 r.p.m. respectively. Taking into account the bearing stiffnesses and masses, and the oil film stiffness, the fundamental critical speed splits into two, namely 797 and 1120 r.p.m., designated horizontal and vertical, respectively, according to the approximate direction of the maximum displacement. The second critical speed of 4000 r.p.m. split into

Card 6/7

83315

S/179/60/000/04/014/027
E191/E181

The Vibrations of Rotors on Bearings with Mass and Elasticity, Taking into Account the Dynamic Properties of the Oil Film in a Sliding Bearing

1765 and 3060 r.p.m. respectively. These computations were made with the help of stiffness values derived from measurements of journal and bearing displacements in rotation. The measured values of the actual critical speeds agreed with the critical speed values predicted by the above procedure within a few per cent.
There are 5 figures, 1 table and 12 references: 10 Soviet, 1 German and 1 English.

SUBMITTED: December 26, 1959

Card 7/7

LYUDIN, G.L., inzh., POZNYAK, E.L., kand.tekhn.nauk, SAKHAROV, I.Ye., kand.fiz.-matem.nauk

Experimental determination of the give of the oil film in th sleeve bearings and of the critical velocities of the rotor of a TB2-100-2 turbogenerator. Vest. elektroprom. 31 no.5:1-8 My '60. (MIRA 13:8)

(Turbogenerators)

POZNYAK, E.L. (Moskva)

Dynamic properties of oil film in antifriction bearings. Izv.AN SSSR.Otd.tekh.nauk.Mekh.i mashinostr. no.6:52-67 N-D '61. (MIRA 14:11)

(Bearings (Machinery)--Lubrication)

89807
S/110/61/000/002/001/009
E035/E517

9.7000

AUTHORS: Mel'nikova, F.M., Engineer, Poznyak, E.L., Candidate of Technical Sciences, Raykhlina, B.B., Engineer and Rozenknop, V.D., Engineer

TITLE: The Calculation of Critical Speeds of Large Turbo-Alternators with the Aid of Digital Computers

PERIODICAL: Vestnik elektropromyshlennosti, 1961, No.2, pp.1-8

TEXT: Two difficulties arise in the determination of critical speeds of large machines; firstly, that the values of the various constants to be used in the computation are not always accurately known; and, secondly, that for shafts with many rotating masses and bearings, the numerical computations become exceedingly lengthy. The authors have solved the second problem by using a computer. For large machines the analysis should take into account the 'elasticity' of the oil films in the bearings as well as the masses of the bearings and the elastic constants of their anchorages. These elastic constants are usually different in the horizontal and vertical directions. On the other hand, the analysis can assume that the shaft is everywhere truly circular, and may neglect forces along the shaft, and gyroscopic effects. The analysis depends on

The Calculation of Critical Speeds ....

finding two modes of oscillation of the stationary shaft in two independent directions (corresponding to the horizontal and vertical elastic constants of the bearings); then the critical speeds of the shaft will be equal to the frequencies of these two modes. The partial differential equation for a shaft in oscillation is:

$$\mu(x) \frac{\partial^2 y(x,t)}{\partial t^2} + \frac{\partial^2}{\partial x^2}\left[EI(x) \frac{\partial^2 y(x,t)}{\partial x^2}\right] = 0, \quad (2)$$

where x is the distance along the shaft, $\mu(x)$ is the mass/unit length of the shaft at point x, $EI(x)$ is the stiffness at point x, $y(x,t)$ is the deflection of the shaft at point x and time t. The general solution of Eq.(2) is of the form:

$$y(x,t) = y(x) \cos \Omega t \quad (3)$$

where Ω is a critical frequency of speed. With this general solution we can derive an ordinary differential equation:

$$\frac{d^2}{dx^2}\left[EI(x) \frac{d^2 y(x)}{dx^2}\right] - \mu\Omega^2 y(x) = 0. \quad (4)$$

Card 2/7

and, with the aid of the differential relations

$$\frac{dM}{dx} = V; \qquad \frac{dy}{dx} = \theta, \tag{5}$$

where M is the bending moment; V is the shear force, θ is the slope of the shaft, we can express Eq.(4) as two separate second-order differential equations:

$$\frac{d^2y}{dx^2} = \frac{d\theta}{dx} = \frac{M}{EI} \tag{6}$$

and

$$\frac{d^2M}{dx^2} = \frac{dV}{dx} = \mu\Omega^2 y. \tag{7}$$

The boundary conditions for the solution of these two equations can be expressed by considering the bearings at the end of the shaft; there are initially two unknowns at each end. From many possible methods of solution, the following was chosen: Eqs. (6) and (7) are

approximated by finite difference expressions. A value of frequency ω which is within the range being investigated, but is not, in general, equal to a critical frequency, is selected, and the equations are solved twice. For the first solution, one of the unknown boundary conditions at the left hand end of the shaft is given an arbitrary value of 1 and the other is made equal to 0. For the second solution, these boundary conditions are reversed. A linear combination of these two solutions is examined to see whether it satisfies the boundary conditions at the right hand end of the shaft. This will not, in general, be the case; for the boundary conditions will only be satisfied if $\omega = \Omega$. In general, therefore, a function $\Phi(\omega)$, which has the properties that

$$\Phi(\Omega) = 0, \text{ and } \Phi(\Omega + \delta\Omega) \cdot \Phi(\Omega - \delta\Omega) < 0$$

is calculated. Starting at the low end of the frequencies to be investigated, the equations are solved and Φ calculated for steadily increasing values of ω. The presence of a critical speed in the neighbourhood of the current value of ω is detected by a change in the sign of $\Phi(\omega)$. The exact value of the critical frequency can

then be located by searching between the last two values of ω with successively smaller increments or decrements in ω. A root is found by one of two criteria: a) that $|\Delta\omega| < \varepsilon$, or b) that $|\Phi(\omega)| < \varepsilon_1$. In the actual example solved, the shaft is represented by a finite approximation consisting of a number of masses connected by a flexible but mass-less shaft. Using recurrence relations for variables such as the shear force and bending moment at the position of the i-th mass in terms of these variables at the (i-1)th mass, and the constants associated with the (i-1)th mass, the finite difference equations can be solved: for example, the recurrence relation for the shear force at the i-th mass is:

$$V_i = V_{i-1} + m_{i-1} y_{i-1} \omega^2 \qquad (11)$$

where m_i is the mass of the i-th mass, and y_i is the deflection of the shaft at the i-th mass. The recurrence relationships take a slightly different form at the positions of the bearings. Whenever a value of Ω is determined by this system, a calculation of the actual deflected form of the shaft is made. The critical speeds of a large turbo-generator shaft about 29 m long, comprising

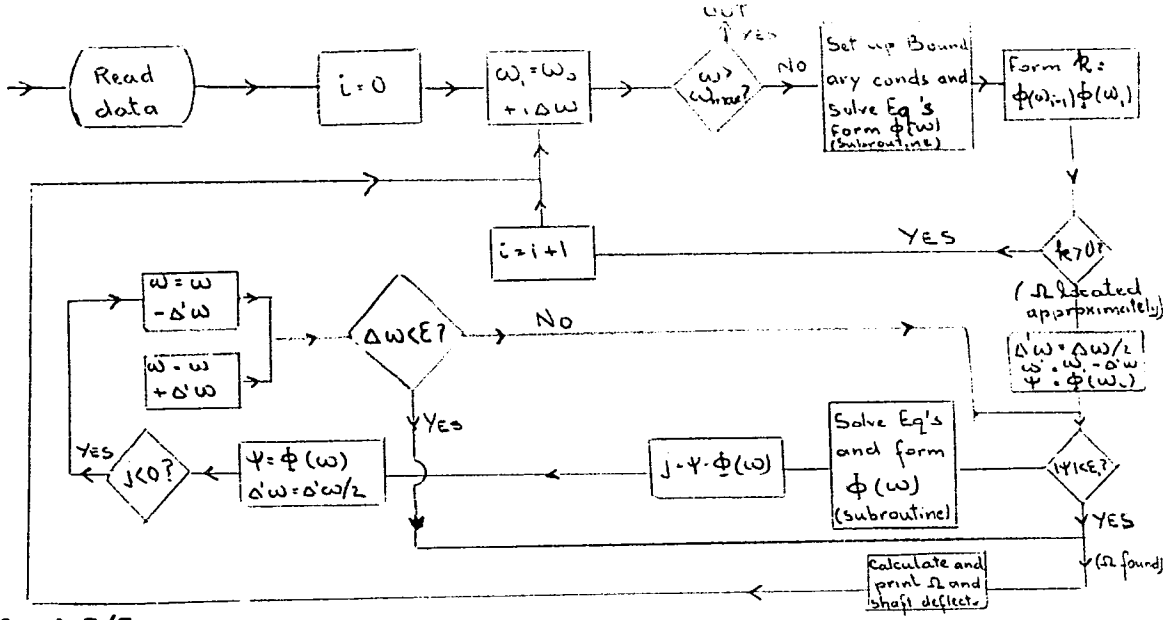
a 3-stage turbine and an alternator rotor, and supported on seven bearings, were computed on a "STRELA" (СТРЕЛА) computer. The shaft was considered to consist of 122 masses, and the finite difference equations were solved in a corresponding number of steps. The flow chart for the calculation is shown in Fig.3. In the range of speeds investigated, 0 to 3800 r.p.m., the shaft was found to have 5 critical speeds for vertical oscillation, and 6 for horizontal oscillation. One of the vertical critical speeds (2850 r.p.m.) was quite close to the running speed of the shaft (3000 r.p.m.). Two of the critical speeds, including this one, were mainly due to oscillation of the rotor, and not the turbines. A separate calculation involving only the rotor showed that its own critical speeds were little affected by the presence of the turbine. The entire calculation took only 10 to 15 minutes. There are 4 figures, 2 tables and 7 references: 5 Soviet and 2 non-Soviet.

SUBMITTED: May 12, 1960

89307

S/110/61/000/002/001/009

The Calculation of Critical Speeds... E035/E517



Card 7/7